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EXAMINER	
CRAIG, DWIN M	

ART UNIT	PAPER NUMBER
2123	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/801,643	KRAMER ET AL.	
	Examiner	Art Unit	
	Dwin M. Craig	2123	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 May 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *9-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *9-22* is/are rejected.

7)☒ Claim(s) *13 and 14* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *27 July 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☒ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *8/14/07*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 9-22 have been presented for reconsideration based on Applicants' arguments.

Response to Arguments

2. Applicants' arguments presented in the 5/29/2007 responses have been fully considered; the Examiner's response is as follows:

2.1 The Examiner thanks the Applicants' for submitting and amended abstract and hereby withdraws the objection to the same.

2.2 Applicants' have failed to clarify the status of the submission of the listing of references labeled "1 of 1" in the IDS submitted on 9/14/2004, the Examiner notes that the references submitted were considered on the merits and therefore the issue as regards which IDS submission those references were submitted in is considered moot.

2.3 Regarding Applicants response to the objections to claims 13 and 14, the Applicants' have failed to amend claims 13 and 14 to overcome the objections to the same and therefore the objections will be maintained.

2.4 Regarding priority, the Examiner maintains the previously set forth position that Applicants' do not have support for claims 10, 11, 12, 13, 20 and 21 do not have support from the cited priority documents. Further the Examiner notes that the MPEP is clear in regards to the introduction of new matter into a specification in a continuation.

MPEP section 602.05(a) discloses:

> If the examiner determines that the continuation or divisional application contains new matter relative to the prior application, the examiner should so notify the applicant in the next Office action. The examiner should also (A) require a new oath or declaration along with the surcharge set forth in 37 CFR 1.16 (f); and (B) indicate that the application should be re-designated as a continuation-in-part.

Applicants' need to re-designate their application as a continuation-in-part and provide a new oath and declaration as required.

2.5 Regarding the Applicants' response to the 35 U.S.C. 112 rejections of claims 10, 11, 12, 13 , 20 and 21, the Examiner respectfully traverses Applicants' arguments, MPEP section 201.06c clearly teaches that:

A continuation or divisional application may be filed under 35 U.S.C. 111(a) using the procedures set forth in 37 CFR 1.53(b), by providing: (A) a new specification and drawings and a copy of the signed oath or declaration as filed in the prior application provided the new specification and drawings do not contain any subject matter that would have been new matter in the prior application; or (B) a new specification and drawings and a newly executed oath or declaration provided the new specification and drawings do not contain any subject matter that would have been new matter in the prior application. (emphasis added).

Applicant's specification contains new matter not previously described in abandoned U.S. non-provisional application number 09432362. More specifically the new matter relates to the simulation of a second hand and the illustrations in Figure 8.

The previously applied 35 U.S.C. 112 written description rejection of claims 10, 11, 12, 13, 20 and 21 will be maintained.

2.6 Regarding Applicants' response to the 35 U.S.C. 103(a) rejections of claims 9-22, the Examiner respectfully traverses Applicants' arguments.

On page 12 of the 5/29/2007 responses Applicants' argued;

> Thus contrary to the allegation in the Office Action, Massie fails to disclose "a *device for measuring the configuration of said physical multi-articulated structure*" (Claim 9, emphasis added), because, as the Office Action acknowledges and supports with source citation, the Massie device is merely intended to "keep track of the user's position with respect to that freedom" (emphasis added). Massie is thus only concerned with the end point of the user's thumb, finger, stylus or the like; Massie is not concerned with the configuration of the whole of the multi-articulated device and does not endeavor to depict the whole device in the virtual environment, despite the gratuitous mention of the "user contact apparatus" (Massie, col. 23, l1.27-33).

The *device* of *Massie* discloses the attached control circuitry, see Figure 13, in order for the device in *Massie* to function correctly the *configuration* of the device, as disclosed in Figures 1-4 and 6-11 would have to be known to item 1320 in Figure 13, in order for the *Virtual environment* to properly place the *user point location* see item 1312 in the figure, the *configuration* of the multi-articulated device as disclosed in figures 1-4 and 6-11 would have to be known, therefore the teaching of *a device for measuring the configuration of said physical multi-articulated structure* is required in order for the system as disclosed in *Massie* to function.

On page 12 of the 5/29/2007 responses Applicants' argued;

> They are not intended to map the configuration of a physical device to that of a virtual one. Applicant's disclosure and emphasis are fully consistent with such a definition of "configuration," rather than simple point mapping, as for example FIGS. 5, 6 and 7, which provide detailed representations of all the articulating joints and axes of the hand, show.

Applicants' appear to be attempting to read a special definition for *configuration* into the meaning of the claim language, the Examiner applied a reasonably broad interpretation of the word *configuration* to mean that the system attached to the multi-articulated structure would be required to know the *initial configuration* of that multi-articulated structure in order to properly function, therefore the Examiner maintains the previously applied interpretation of the claims.

On page 13 of the 5/29/2007 responses Applicants' further argued;

> In addition, Massie fails to disclose flexure of the simulated multi-articulated structure based on constraint data of the simulated impediment and the simulated multi-articulated structure. In fact Massie fails to disclose any flexure, and certainly fails to disclose flexure of the configuration of the simulated multi-articulated structure. The allegation in the Office Action that "generating resisting force is functionally equivalent to "flex"' (emphasis original) is untenable.

The Examiner respectfully traverses Applicants' arguments, Applicants' have argued that *Massie* fails to teach or suggest that the multi-articulated structure discloses a *flexure* based on data from the simulation system, the Examiner points to Col. 23 lines 51-54 "Thus the further the point is "beyond" the virtual wall, the greater will be the **resisting force**..." the generation of a *resisting force* is like producing a *flex* because the produced *flex* is supposed to mimic the effect of the virtual hand having contact with a virtual surface which is static or unmovable in the virtual world, therefore *Massie* is effectively teaching production of a force that is functionally the same as the claimed *flex*, again the Examiner is merely applying a reasonably broad interpretation of the current claim language and noting that when the multi-articulated structure produces a *flex* that the *flex* exerts a *force*, which is exactly what *Massie* teaches.

On page 14 of the 5/29/2007 responses Applicants' argued;

> No discussion or suggestion of deformation of a simulated multi-articulated structure when a simulated interaction occurs between a simulate multi-articulated structure and a simulated object is provided.

The Examiner respectfully traverses Applicants' arguments, no suggestion is required for a proper combination of teachings under 35 U.S.C. 103(a), Further and in regards to the requirement for a teaching, suggestion and/or motivation please see *Dann v. Johnson*, 425 U.S. 219, 189 USPQ 257 (1976) and *Leapfrog Enterprises, Inc. v. Fisher-Price, Inc.*, --F.3d--, 82 USPQ2d 1687 (Fed. Cir. 2007) as well as *KSR International Co. v. Teleflex Inc.*, 550 U.S. --, 82 USPQ2d 1385 (2007). The cited cases recently decided by the Federal Circuit Court as well as the U.S. Supreme Court clearly set forth that the references themselves do not have to expressly disclose a teaching, suggestion or motivation to combine references in an obviousness type of art rejection.

2.7 Applicants' arguments have been unpersuasive and the previously applied prior art rejections under 35 U.S.C. 103(a) will be maintained.

Claim Objections

3. Claims 13 and 14 are objected to because of the following informalities: line 2 of claim 13 appears to have a period, line 3 of claim 13 appears to have a comma after the word physical, line 14 of claim 13 has the following, *"...hand ins said..."* it is unclear to the examiner what the phrase *"ins"* is supposed to mean. Line 10 of claim 14 appears to have a period in the sentence.

Appropriate correction is required.

Priority

4. Applicant's claim for the benefit of a prior-filed application under 35 U.S.C. 119(e) or under 35 U.S.C. 120, 121, or 365(c) is acknowledged. Applicant has not complied with one or more conditions for receiving the benefit of an earlier filing date under 35 U.S.C. 120 as follows:

The later-filed application must be an application for a patent for an invention, which is also disclosed, in the prior application (the parent or original nonprovisional application or provisional application). The disclosure of the invention in the parent application and in the later-filed application must be sufficient to comply with the requirements of the first paragraph of 35 U.S.C. 112. See *Transco Products, Inc. v. Performance Contracting, Inc.*, 38 F.3d 551, 32 USPQ2d 1077 (Fed. Cir. 1994).

The disclosure of the prior-filed application(s), Application No. 09/432,362 and 09/076,617, fail to provide adequate support or enablement in the manner provided by the first paragraph of 35 U.S.C. 112 for one or more claims of this application.

Accordingly claims 10, 11, 12, 13, 20 and 21 are not entitled to priority from the prior applications.

Further the Examiner now objects to the Oath and Declaration because Applicant's non-provisional Application is a Continuation-in-part and not just a continuation.

Applicants are required to submit a NEW OATH or DECLARATION, the surcharge set forth in 37 CFR 1.16(f), and redesignate the application as a CONTINUATION-IN-PART. See MPEP 602.05(a) for further information.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claims 10, 11, 12, 13, 20 and 21 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The specification fails to disclose *a simulated hand* or *a second simulated hand and/or multi-articulated structure* further the specification fails to show support for the specific limitation *using a simulated spring attached between first and second simulated hands, where the angles and placement, of said first simulated hand uses said digitized measured signals and the angles and placement of said second simulated hand uses said modified signals and said first and second simulated hands are superimposed in the absence of said second simulated hand encountering said simulated impediment.*

5.1 Examiner notes that during prosecution of case S/N 09/432,362 that substantially the same rejection was set forth.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 9, 14, 15, 16 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 5,625,576 to Massie.

6.1 Regarding claim 9, Massie teaches, *a system for moving a simulated-multi-articulated structure in relation to the movement of an analogous physical-multi-articulated structure* (Figure(s) 1, 2A & 11 and the descriptive text and Col. 4 lines 9-28 and Col. 23 lines 27-33 "a graphical representation or abstraction of the user contact apparatus and its **location relative to the virtual environment**..." a virtual environment is functionally the same as a simulated environment),

where said simulated-multi-articulated structure moves in a simulated environment (a virtual environment is functionally equivalent to a simulated environment, see Col. 2 lines 27-30 more specifically "...control **virtual** machines and **environments**..." and Col. 8 lines 22-33 and Col. 22 lines 54-67 "...user interface with a **virtual environment**..." as regards the moving of the simulated articulated structure see, Col. 25 lines 1-16 more specifically "These necessary changes are calculated at **1320**, and the record or image or representation of the virtual environment is changed accordingly. If a display is being used, the present state of the virtual environment and the user reference point is displayed **1322.**"),

comprising a simulated impediment to free motion (Col. 3 lines 13-33 "...**virtual object**..." and Col. 15 lines 27-38 "illusion of a **solid** wall..." and Col. 23 lines 50-59 "...the further the point is "beyond" the virtual wall, the greater will be the resisting force. Common experience is that very hard walls do not admit of any intrusion beyond the rest plane"),

where said physical-multi-articulated structure moves in an environment lacking an analogous physical impediment (Col. 2 lines 27-31 "...which are **not** physical, but rather are "embodied" or reside in a computer model..." see also Col. 15 lines 12-25 and Col. 15 line 38 "illusion of a solid wall."),

said system comprising: a device for measuring the configuration of said physical-multi-articulated structure (Figure 5 and the descriptive text more specifically, references # 550, 562, 570 & 580 and Col. 10 lines 44-53 and Col. 12 lines 60-67 and Col. 13 lines 1-13 "...keep track of the user's position with respect to that freedom..." and Col. 23 lines 12-64 and Col. 22 lines 24-34 and Col. 20 lines 54-67 and Col. 21 lines 1-12),

and the spatial placement of said physical-multi-articulated structure relative to an inertial reference frame and providing digitized signals associated with the configuration and spatial placement;(Figure(s) 12 & 13 references # 1236 & 1312, 1314, 1316, 1318, 1320 and more specifically, Col. 7 lines 57-62 and Col. 10 lines 44-53 and Col. 24 lines 6-25),

and a data processor (Figure 12 # 1236), *comprising data related to the spatial placement of said simulated impediment and constraints of said simulated impediment and said simulated-multi-articulated structure, for receiving said digitized signals* (the examiner notes that signals are being generated by the different elements in Figure 5, 12 and 13 and more specifically in figure 5 signals between blocks #502, 500, 506, 536, 540, 550, 564, 560, 566, 550, 562, 574, 572, 570, 580 and going to Figure 13 signals between blocks #1312, 1314, 1316, 1318, 1320, 1322 and 1324 and see the descriptive text concerning these items and figures) *and modifying said digitized signals using said data to generate a set of modified signals specifying the configuration and spatial placement of said simulated-multi-articulated structure,* (Col. 24 lines 6-25, more specifically, "The force signal also passes to a virtual environment reaction calculator **1236**, which determines if ant changes should be made to the geometrical representation of the virtual environment" and regarding spatial placement see Col. 24 lines 43-65 "...a method of generating a force feedback signal based on making the comparisons between

the physical location of the user connected reference point and the virtual environment" and "...location of the user reference point is related **1314** to the geometry..."),

such that when said simulated-multi-articulated structure encounters said simulated impediment, the configuration and spatial placement of said simulated-multi-articulated structure is in part determined by the constraints causing said simulated-multi-articulated structure to flex (Col. 23 lines 51-54 "Thus, the further the point is "beyond" the virtual wall, the greater will be the **resisting force**..." and Col. 15 lines 12-26, generating resisting force is functionally equivalent to a *"flex"*).

While the cited reference does not use the exact same terminology as Applicant's claims, it would be obvious to an artisan of ordinary skill in the art, at the time of the invention was made, to have taken the teachings of Massie and derive the specific limitations as disclosed in Applicant's claim language.

6.2 Regarding claim 14 see the rejection of claim 9 above.

6.3 Regarding claim 15 see the rejection of claim 9 above.

6.4 Regarding claim 16 see the rejection of claim 9 above.

6.5 Regarding claim 22 see the rejection of claim 9 above.

7. Claims 10, 11, 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 5,625,576 to Massie in view of U.S. Patent 6,104,379 to Petrich.

7.1 Regarding claim 10, Massie teaches, *a system for moving a simulated hand in relation to the movement of a physical hand* (Figure(s) 1, 2A & 11 and the descriptive text and Col. 4 lines 9-28 and Col. 23 lines 27-33 "a graphical representation or abstraction of the user contact

apparatus and its **location relative to the virtual environment**..." a virtual environment is functionally the same as a simulated environment),

where said simulated hand moves in a simulated environment comprising a simulated impediment to free motion (Col. 3 lines 13-33 "...**virtual object**..." and Col. 15 lines 27-38 "illusion of a **solid** wall..." and Col. 23 lines 50-59 "...the further the point is "beyond" the virtual wall, the greater will be the resisting force. Common experience is that very hard walls do not admit of any intrusion beyond the rest plane"),

where said physical hand moves in an environment lacking an analogous physical impediment (Col. 3 lines 13-33 "...**virtual object**..." and Col. 15 lines 27-38 "illusion of a **solid** wall..." and Col. 23 lines 50-59 "...the further the point is "beyond" the virtual wall, the greater will be the resisting force. Common experience is that very hard walls do not admit of any intrusion beyond the rest plane"),

said system comprising: a device for measuring the configuration of said physical hand and the spatial placement of said physical hand relative to an inertial reference frame and providing digitized signals associated with the configuration and spatial placement (Col. 24 lines 6-25, more specifically, "The force signal also passes to a virtual environment reaction calculator **1236**, which determines if ant changes should be made to the geometrical representation of the virtual environment" and regarding spatial placement see Col. 24 lines 43-65 "...a method of generating a force feedback signal based on making the comparisons between the physical location of the user connected reference point and the virtual environment" and "...location of the user reference point is related **1314** to the geometry...");

and a data processor, (Figure 12 # 1236) *comprising data related to the spatial placement of said simulated impediment and constraints of said simulated impediment and said simulated hand, for receiving said digitized signals and modifying said digitized signals using said data to generate a set of modified signals specifying the configuration and spatial placement of said simulated hand* (the examiner notes that signals are being generated by the different elements in Figure 5, 12 and 13 and more specifically in figure 5 signals between blocks #502, 500, 506, 536, 540, 550, 564, 560, 566, 550, 562, 574, 572, 570, 580 and going to Figure 13 signals between blocks #1312, 1314, 1316, 1318, 1320, 1322 and 1324 and see the descriptive text concerning these items and figures), *such that when said simulated hand encounters said simulated impediment, the configuration and spatial placement of said simulated hand is in part determined by the constraints* (Col. 24 lines 6-25, more specifically, "The force signal also passes to a virtual environment reaction calculator **1236**, which determines if ant changes should be made to the geometrical representation of the virtual environment" and regarding spatial placement see Col. 24 lines 43-65 "...a method of generating a force feedback signal based on making the comparisons between the physical location of the user connected reference point and the virtual environment" and "...location of the user reference point is related **1314** to the geometry...") *causing said simulated hand to flex* (Col. 23 lines 51-54 "Thus, the further the point is "beyond" the virtual wall, the greater will be the **resisting force**..." and Col. 15 lines 12-26, generating resisting force is functionally equivalent to a *"flex"*).

However, Massie does not expressly disclose a "simulated hand".

Petrich teaches the functional equivalent of a simulated hand, a virtual hand (Col. 8 lines 32 "a virtual hand...").

Massie and Petrich are analogous art because they are both from the same field of endeavor of creating a virtual reality using a computer system and a multi-articulated input device.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to present a user with a visual representation of a hand or simulated hand as disclosed by Petrich when using the multi-articulated structure as disclosed in Massie.

The suggestion for doing so would have been to provide a greater sensation of reality while using a virtual reality system and as such enhance the feeling of reality through the use of tactile feedback (see Col. 2 lines 7-54 Petrich).

Therefore, it would have been obvious to combine Petrich with Massie to obtain the invention in claims 10, 11, 12 and 13.

7.2 Regarding claim 11, Massie teaches the functional equivalent of a, *simulated hand encountering said simulated impediment; such that when said simulated hand encounters said impediment, said simulated hand flexes* (Col. 23 lines 51-54 "Thus, the further the point is "beyond" the virtual wall, the greater will be the **resisting force**..." and Col. 15 lines 12-26, generating resisting force is functionally equivalent to a *"flex"*), and the functional equivalent of *said constraints using a simulated spring attached* (Col. 5 lines 19-32, more specifically "The force rules include **spring**-force rules which specify a switch output force signal in response to a location signal of the user reference point indicative of a deflection conformation of the **spring**-type element...").

However, Massie does not expressly disclose, *wherein said device comprises goniometers for measuring the angles of the joints of a physical hand, a tracking device for*

measuring the spatial placement of said physical hand relative to an inertial reference frame and means for mounting said device on said physical hand, said device providing digitized measured signals associated with the angles and the spatial placement; and said data processor producing modified signals from said digitized measured signals and said constraints using a simulated spring attached between first and second simulated hands, where the angles and placement, of said first simulated hand uses said digitized measured signals and the angles and placement of said second simulated hand uses said modified signals and said first and second simulated hands are superimposed in the absence of said second simulated hand encountering said simulated impediment; such that when said second simulated hand encounters said impediment, said second simulated hand flexes and is displaced from said first simulated hand and realigns with said first simulated hand when said impediment is removed.

More specifically, Massie does not expressly disclose the use of *goniometers* and the presence of both a *second virtual hand* and a *second multi-articulated hand.*

However, Petrich substantially teaches or makes obvious, *wherein said device comprises goniometers for measuring the angles of the joints of a physical hand,* (Figures 7A and 7B-7D and Col. 3 lines 15-24) *a tracking device for measuring the spatial placement of said physical hand relative to an inertial reference frame and means for mounting said device on said physical hand, said device providing digitized measured signals associated with the angles and the spatial placement;* (Col. 4 lines 14-20 "Software for processing the signals and for interpreting the inputs from the **spatial** hand positioner...") *and said data processor producing modified signals from said digitized measured signals and said constraints using a simulated spring attached between first and second simulated hands,* (see Figure 1A # 106 and 107 and the descriptive text

therein, note the hardness configuration in figure 1A this configuration along with the sensing amplifiers provides for the same effect as a *virtual spring* (see the discussion of the teachings of Massie above) *where the angles and placement, of said first simulated hand uses said digitized measured signals and the angles and placement of said second simulated hand uses said modified signals* (Figure 8A and 8B and the descriptive text and Col. 11 lines 23-60) *and said first and second simulated hands are superimposed in the absence of said second simulated hand encountering said simulated impediment;* (it is noted that Massie teaches a simulated impediment, see Figure 1A item # 108 and the discussion presented above) *such that when said second simulated hand encounters said impediment, said second simulated hand flexes and is displaced from said first simulated hand and realigns with said first simulated hand when said impediment is removed* (see Figure 1A items # 106, 108 & 107 and Figure 7 and Col. 11 lines 23-60 which discloses that the system detects the position and it would be obvious, to an artisan of ordinary skill at the time of the invention to realign the two virtual hands because there needs to be a starting reference point in the virtual world so that the virtual objects will have a starting virtual reference point relative to the virtual hands).

7.3 Regarding claim 12, see the rejections of claims 10 and 11 above, it is noted by the examiner that all of the claimed limitations of claim 12 are described in the rejections of claims 10 and 11 above.

7.4 Regarding claim 13, see the rejections of claims 10 and 11 above, it is noted by the examiner that all of the claimed limitations of claim 12 are described in the rejections of claims 10 and 11 above.

8. Claims 17-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 6,104,379 to Petrich.

8.1 Regarding claim 17, Petrich teaches or substantially teaches *a device, comprising: a multi-articulated structure;* (Figure 2 items #201, 204, 205, 206, 207, 208) *and a sensor coupled to the multi-articulated structure,* (Figures 7A-7D and Figure 8A item # 802 "Hall Sensor" and Figures 5B and 6A and the descriptive text, more specifically Col. 3 lines 15-23 and Col. 10 lines 28-65) *the sensor configured to determine a configuration of the multi-articulated structure and a spatial placement of the multi-articulated structure relative to an inertial reference frame, said sensor further configured to transmit a signal associated with the configuration* (Figures 8A and 8B and Col. 11 lines 61-67 and Col. 12 lines 1-25) *and the spatial placement of the multi-articulated structure, the signal being configured to generate a set of modified signals specifying data values associated with a configuration and a spatial placement of a simulated multi-articulated structure displayed in a graphical environment,* (Figure 1A and Col. 6 lines 29-63 and Col. 12 lines 19-26) *the set of modified signals configured to deform the simulated multi-articulated structure when a simulated interaction occurs between the simulated multi-articulated structure and a simulated object* (Col. 6 lines 44-56).

However, Petrich does not expressly teach that *simulated interaction occurs between the simulated multi-articulated structure and a simulated object.*

It would have been obvious, at the time of the invention, to one of ordinary skill in the art, having viewed the configuration of figure 1A and read the disclosed information on Col. 12 lines 11-25 regarding the VirtualHand® Toolkit Library by Virtual Technologies Inc. to use this system to create a Virtual Reality system to provide for simulated interaction between the

simulated multi-articulated structure and a simulated object (Figure 1 item #108). The motivation would be to provide for a Virtual Reality experience that more closely mimics reality and provides for a more realistic virtual reality environment, see Col. 2 lines 7-12.

8.1 Regarding claim 18, Petrich teaches wherein said sensor includes a goniometer configured to determine at least one angle of a joint of the multi-articulated structure (Figures 7A, 7B-7D and 8A and 8B and Col. 3 lines 15-26 "...variable-resistance strain sensing goniometer").

8.2 Regarding claim 19, Petrich teaches wherein said sensor includes a tracking device configured to determine the spatial placement of the multi-articulated structure relative to the inertial reference frame (Col. 1 lines 15-25, "...**spatial** hand position..." and Figure 1 and Col. 12 lines 11-26 "...converts the joint angle data into hand-position data...").

8.3 Regarding claim 20, Petrich teaches a second articulated structure, Figure 1A items # 110 and 109 and Figure 3 items #303 and 304, clearly these teachings show a second multi-articulated structure which is attached to the circuits as disclosed in figures 8A and 8B which teach signals being associated with the structures. Figure 1A clearly discloses simulated (virtual) versions of these articulated structures item # 106 and item # 107 are simulated *virtual* versions of structures item # 109 and item # 110.

8.4 Regarding claim 21, Petrich teaches a second articulated structure, Figure 1A items # 110 and 109 and Figure 3 items #303 and 304, clearly these teaching d show a second multi-articulated structure which is attached to the circuits as disclosed in figures 8A and 8B which teach signals being associated with the structures. Figure 1A clearly discloses simulated (virtual) versions of these structures.

It would have been obvious, at the time of the invention, to an artisan of ordinary skill to have *superimposed* the first simulated multi-articulated structure superimposed on the second simulated multi-articulated structure because when two hands are interacting in actual space they can have contact with each other, further the examiner notes that figure 1A shows the two virtual hands, item #106 and item # 107 manipulating a virtual object, item # 108, during the course of manipulating item # 108, the two articulated structures, items #106 and #107 will most likely will be superimposed over each other.

Conclusion

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dwin M. Craig whose telephone number is (571) 272-3710. The examiner can normally be reached on 10:00 - 6:00 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul L. Rodriguez can be reached on (571) 272-3753. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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